Our world is made of light and matter. While light can travel very fast, it interacts very weakly. On the other hand, matter interacts very strongly, but travels very slowly. The combination of light and matter can give rise to fascinating effects, which light or matter alone cannot show. Dressed electrons and exciton-polaritons are examples of such light-matter coupled systems where the matter is dressed by light to form new quasi particles with unique properties. In the first part of the thesis, we investigate the dressed electrons inside a quantum well and predict that such a system can be used to generate terahertz (THz) waves. This is particularly interesting due to the absence of THz bandgaps in state of the art QWs and it is only because of the dressing field that such a band gap opens up. In the later part, we introduce schemes to obtain robust propagation of exciton-polaritons. Exciton-polaritons are predicted to play an important role in future opto-electronic devices. However, to realize complete devices, robust propagation of polaritons between different components is essential. We predict that the inherent nonlinear nature of the polaritons gives rise to antichiral edge states in a honeycomb lattice strip, where polaritons propagate robustly through the both edges of the strip in the same direction. Next, using the naturally present spin-orbit coupling in the microcavity along with external magnetic field, feedback free robust propagation of polaritons with a particular spin is also predicted. These results are motivated by the recent advance of topological photonics, although we will focus on non-topological systems. We find that in some cases there are trade-offs between having non-trivial or trivial topology in which even topologically trivial systems can partially display desirable effects, more commonly associated to topological systems, while having other advantages such as accessibility in light-matter coupled systems.

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